

Catalogue of American Amphibians and Reptiles.

Webb, Robert G. 1990. *Trionyx*.

***Trionyx* Geoffroy Saint-Hilaire
Softshell Turtles**

Trionyx Geoffroy Saint-Hilaire, 1809a:363. Type-species, *Trionyx aegyptiacus* Geoffroy Saint-Hilaire, 1809 [= *Trionyx triunguis* (Forskål), 1775] by subsequent designation (Bory de Saint-Vincent, 1828:77). See Nomenclatural History.

Amyda Geoffroy Saint-Hilaire, 1809a:365. Type-species, *Amyda javanica* Schweigger, 1809, listed as synonym of *Trionyx javanicus* Geoffroy Saint-Hilaire, 1809 (= *Trionyx cartilagineus* (Boddaert), 1770) by monotypy.

Trionix: Geoffroy Saint-Hilaire, 1809b:legend pls. 1, 2. Ex errore. *Aplaxia* Rafinesque, 1817:166 (*nomen nudum*). Type-species, *Aplaxia nasica* Rafinesque, 1817 (= *Trionyx spiniferus* LeSueur, 1827) by monotypy.

Strionyx: LeSueur, 1827:legend pl. 7. Ex errore.

Aspidonectes Wagler, 1830:134. Type-species, *Aspidonectes aegyptiacus* Wagler, 1830 (= *Trionyx triunguis* (Forskål), 1775) by subsequent designation (Fitzinger, 1843:30).

Apalone Rafinesque, 1832:64. Type-species, *Apalone hudsonica* Rafinesque, 1832 (= *Trionyx spiniferus* LeSueur, 1827) by monotypy.

Mesodeca Rafinesque, 1832:64. Type-species, *Mesodeca bartrami* Rafinesque, 1832 [= *Trionyx ferox* (Schneider), 1783] by monotypy.

Amida: Duméril and Bibron, 1834:416. Ex errore.

Amyde: Duméril and Bibron, 1834:421. Ex errore.

Gymnopus Duméril and Bibron, 1834:363. New replacement name for *Trionyx* Geoffroy Saint-Hilaire, 1809 and *Aspidonectes* Wagler, 1830, *fide* Duméril and Bibron, 1835:466, 472.

Gymnopodus: Duméril and Bibron, 1835:484. Ex errore.

Platypeltis Fitzinger, 1835:109, 120, 127. Type-species, *Platypeltis ferox*, Fitzinger, 1835 [= *Trionyx ferox* (Schneider), 1783] by subsequent designation (Fitzinger, 1843:30).

Pelodiscus Fitzinger, 1835:110, 120, 127. Type-species, *Pelodiscus sinensis*, Fitzinger, 1835 (= *Trionyx sinensis* Wiegmann, 1834) by subsequent designation (Fitzinger, 1843:30).

Aspidonectes: Holbrook, 1842:12, 18. Ex errore.

Potamochelys Fitzinger, 1843:30. Type-species, *Aspidonectes javanicus*, Wagler, 1830 [= *Trionyx cartilagineus* (Boddaert), 1770] by original designation.

Tyrse Gray, 1844:47. Type-species, *Tyrse nilotica* Gray, 1844 [= *Trionyx triunguis* (Forskål), 1775] by subsequent designation (Stejneger, 1907:514).

Dogania Gray, 1844:49. Type-species, *Dogania subplana* Gray, 1844 (= *Trionyx subplanus* Geoffroy Saint-Hilaire, 1809) by monotypy.

Dagonia: Gray, 1856:67. Ex errore.

Glatypeltis: Cope, 1860:296. Ex errore.

Tryonyx: Duméril, 1861:158. Ex errore.

Rafetus Gray, 1864:81. Type-species, *Rafetus euphraticus* Gray, 1864 (= *Trionyx euphraticus* Geoffroy Saint-Hilaire, 1809) by monotypy.

Aspilus Gray, 1864:83. Type-species, *Trionyx cariniferus* Gray, 1856 [= *Trionyx cartilagineus* (Boddaert), 1770] by monotypy.

Landemania Gray, 1869:211, 212, 215. Type-species, *Landemania irrorata* Gray, 1869 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Sarbieria Gray, 1869:211, 212, 220. Type-species, *Sarbieria frenata* Gray, 1869 (= *Trionyx subplanus* Geoffroy Saint-Hilaire, 1809) by monotypy.

Callinia Gray, 1869:211, 212, 214, 221. Type-species, *Callinia spiniferus* Gray, 1869 (= *Trionyx spiniferus* LeSueur, 1827) by subsequent designation (Stejneger, 1907:514).

Fordia Gray, 1869:212, 219. Type-species, *Fordia africana* Gray, 1869 (= *Trionyx triunguis* (Forskål), 1775) by monotypy.

Nilsonia Gray, 1872:332. Type-species, *Nilsonia formosa* Gray, 1872 (= *Trionyx formosus* Gray, 1869) by monotypy.

Isola Gray, 1873a:51. Type-species, *Isola peguensis* Gray, 1873 (= *Trionyx formosus* Gray, 1869) by monotypy.

Ida Gray, 1873a:55. Type-species, *Ida ornata* Gray, 1873 [= *Trionyx cartilagineus* (Boddaert), 1770] by monotypy.

Oscaria Gray, 1873b:157. Type-species, *Oscaria swinhoi* Gray, 1873 [= *Trionyx swinhoi* (Gray), 1873] by monotypy.

Landemannia: Theobald, 1876:28. Ex errore.

Landmania: Heude, 1880:viii. Ex errore.

Yuen Heude, 1880:18. Type-species, *Yuen leprosus* Heude, 1880 [= *Trionyx swinhoi* (Gray), 1873] by subsequent designation (Stejneger, 1907:514).

Rafetus: Heude, 1880:20. Ex errore.

Psilogmathus Heude, 1880:24. Type-species, *Psilogmathus laevis* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Temnognathus Heude, 1880:25. Type-species, *Temnognathus mordax* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Gomphopelta Heude, 1880:27. Type-species, *Gomphopelta officinae* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Coelognathus Heude, 1880:29. Type-species, *Coelognathus novemcostatus* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Tortisternum Heude, 1880:31. Type-species, *Tortisternum novemcostatum* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Ceramopelta Heude, 1880:33. Type-species, *Ceramopelta latirostris* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Coptopelta Heude, 1880:34. Type-species, *Coptopelta septemcostata* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

Cinctisternum Heude, 1880:36. Type-species, *Cinctisternum bincinctum* Heude, 1880 (= *Trionyx sinensis* Wiegmann, 1834) by monotypy.

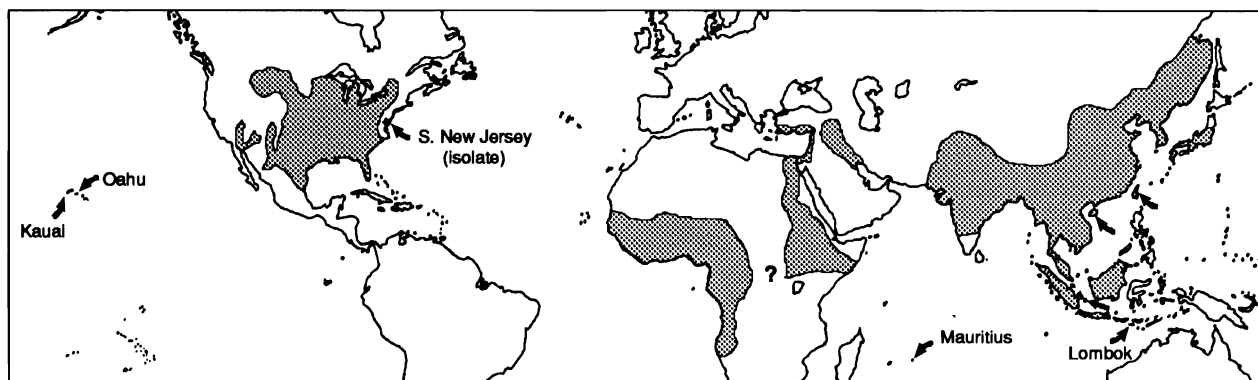
Temnognanthus: Boulenger, 1889:256. Ex errore.

Aspideretes Hay, 1904:274. Type-species, *Trionyx gangeticus* Cuvier, 1824 by original designation.

Aspidonectis: Stejneger, 1907:515. Ex errore.

Triinyx: Smith, 1930:3. Ex errore.

Trinnyx: Ameghino, in Simpson, 1943:423. Ex errore.



Map. Distribution of *Trionyx*. Question mark indicates an area of uncertain range boundaries.

Platyretis: Kirsch, in Stejneger, 1944:8. *Ex errore*.
Euamyda Stejneger, 1944:7, 9, 12. Type-species, *Amyda mutica*, Stejneger, 1944 (= *Trionyx muticus* LeSueur, 1827) by monotypy.
Trionis: Baker, in Loveridge and Williams, 1957:424. *Ex errore*.
Tryonix: Guerin-Meneville, in Loveridge and Williams, 1957:424. *Ex errore*.
Amyda: Richter, 1961:7. *Ex errore*.
Asperidites: Romer, 1966:366. *Ex errore*.
Aspideretes: Morafka, 1977:160. *Ex errore*.
Landemenia: Scudder, in Smith and Smith, 1980:204. *Ex errore*.
Aspidonectus: Beyer, in Smith and Smith, 1980:204. *Ex errore*.
Trionyx: Winokur, 1982:83. *Ex errore*.
Trionyx: Bull, Legler, and Vogt, 1985:784. *Ex errore*.
Palea Meylan, 1987:77, 94. Type-species, *Trionyx steindachneri* Siebenrock, 1906 by original designation.
Asperidites: Weems, 1988:119. *Ex errore*.

• **Content.** Fifteen extant species are generally recognized worldwide, of which 12 are extralimital in the Old World (*Trionyx cartilagineus*, *T. euphraticus*, *T. formosus*, *T. gangeticus*, *T. burum*, *T. leithii*, *T. nigricans*, *T. sinensis*, *T. steindachneri*, *T. subplanus*, *T. swinhoei*, and *T. triunguis*). Only the three indigenous American species (*T. ferox*, *T. muticus*, and *T. spiniferus*) and two Old World species introduced into Hawaii (*T. sinensis* and *T. steindachneri*) are treated here. See Comment.

• **Definition.** In this paragraph the combination of features accommodates all 15 extant species, and also characterizes the subfamily Trionychinae (only included genus, *Trionyx*); the genera *Chitra* and *Pelochelys*, traditionally included in the Trionychinae, are regarded as comprising a separate subfamily, Chitridinae (Webb, in press). Femoral flaps are absent. The anterodistal part of the forelimb usually bears three cusp-edged scales that are proximal to upper marginal, completely smooth scale; upper cusp-edged scale is often partly smooth. The anterior rim of the carapace is distinct from skin of neck, and usually has a marginal ridge. The carapace of hatchlings-juveniles usually has longitudinal rows of tiny tubercles, which are lost in adults. The bony carapace of the young has a fontanelle behind the nuchal that usually disappears with increasing size. Prenuchal and peripheral bones are absent. One or two neurals occur between first pair of costals. The hypoplastron usually has single medially projecting prong. The most lateral prong of the posteromedial process of hypoplastron supports xiphioplastron. Hypoplastra and hypoplastra are usually not fused. Callosities are usually well developed on hyoplastra, hypoplastra, and xiphioplastra, but are of variable occurrence (usually small) on the entoplastron and epiplastra in large adults. The posterior horn of the hyoid apparatus is not prominently expanded, and is subdivided into one or more elements. The postorbital arch of the skull is narrower than the horizontal diameter of the orbit, and the skull has a vertical vomer-prefrontal strut.

Of the five species of *Trionyx* treated here, *T. spiniferus* and *T. muticus* lack both a marginal ridge and (in young) longitudinal rows of tubercles, *T. ferox* has fused hyoplastra and hypoplastra, and all five species have one neural between the first pair of costals.

• **Descriptions and Illustrations.** Generic descriptions of varying detail are in Boulenger (1889), Siebenrock (1909), Smith (1931), Loveridge and Williams (1957), Mylnarski (1976), Broin (1977), and Smith and Smith (1980). Osteological features of all species are described in Meylan (1987). Identifying descriptions of, and illustrations of most, all species are in Webb (in press).

The three American species were described in detail and illustrated by Webb (1962) with more brief descriptions and sources of other illustrations cited for each species in Webb (1973b-d). Some good subsequent illustrations in color of all three species are in Ashton and Ashton (1985), Ernst and Barbour (1972), and Mount (1975); other illustrations are in Caldwell and Collins (1981, *T. spiniferus* and *T. muticus* in color), and Ernst (in McCoy, 1985, *T. muticus*). Updated maximal sizes (carapace length, females) are 67.3 cm for *T. ferox* (Allen, 1982), 54.0 cm for *T. spiniferus* (Halk, 1986), and 35.6 cm for *T. muticus* (Dundee and Rossman, 1989).

Descriptive comments for *Trionyx sinensis* are in Heude (1880), Siebenrock (1907), Stejneger (1907), Schmidt (1927), Smith (1931), Chang (1932), Pope (1935), and Bourret (1941). Some good illustrations of *T. sinensis* are of juveniles (Gray, 1856:Pl. 31; Ernst

and Barbour, 1972, color), ventral pattern of juveniles (Stejneger, 1907; Mao, 1971), adults in color (Karsen et al., 1986); head patterns (Petzold, 1963; Mao, 1971, color); skulls, carapaces and plastra (Heude, 1880:pls. 2-9; Bourret, 1941).

Descriptions of *Trionyx steindachneri* are in Rivers (1889), Siebenrock (1906, translated in Pope 1935; 1907), Smith (1931), Bourret (1941), Petzold (1963), and McKeown and Webb (1982). Some illustrations are of hatchling (McKeown, 1978, color, as *T. sinensis*), hatchling and adult (McKeown and Webb, 1982), subadult (Siebenrock, 1907; copied in Pope, 1935, Smith, 1931 [only head-neck], and Wermuth and Mertens, 1961), adults (Petzold, 1963; Karsen et al., 1986, color), juvenile head pattern (Siebenrock, 1906, copied in Pope 1935); carapace, plastron, and aspects of skull (Bourret, 1941, skull copied in Wermuth and Mertens, 1961).

• **Distribution.** The genus *Trionyx* occurs in North America (southeastern Canada, United States, northeastern Mexico), central Africa and the Nile River drainage, southern coastal Turkey and the Tigris-Euphrates drainage, eastern China and adjacent U.S.S.R., Japan, and the Indian subregion from Pakistan through southeast Asia and the Sunda Archipelago (and some neighboring islands).

Of the five species treated here, the distribution of the three North American species (*T. ferox*, *T. muticus*, *T. spiniferus*) is detailed in Catalogue accounts 138-140 (Webb, 1973b-d); updated maps with spot localities are in Iverson (1986). *Trionyx muticus* seemingly has been extirpated in western Pennsylvania (McCoy, 1982; Ernst in McCoy, 1985).

Trionyx sinensis occurs along the eastern seaboard of China (including the Korean peninsula), ranging as far north as the Amur River drainage into U.S.S.R. and south as far as central Vietnam, and including the major islands of Hainan, Taiwan, and Japan (distribution map with spot localities, Iverson, 1986). *Trionyx sinensis* has been successfully introduced on the island of Kauai, Hawaii (McKeown and Webb, 1982).

Trionyx steindachneri is indigenous to southeastern China, adjacent northern Vietnam, and the island of Hainan, and has been successfully introduced on the island of Mauritius in the Indian Ocean (Bour, 1984), and the islands of Kauai and Oahu, Hawaii (McKeown and Webb, 1982).

• **Fossil Record.** Most shell fragments (with characteristic sculpturing) can be assigned to the genus *Trionyx* (or as trionychid) but they are usually not otherwise diagnostic. Hummel (1929) treated fossil trionychids worldwide. More recently, citing Kuhn, Mylnarski (1976) noted 150 fossil species, whereas Smith and Smith (1980) recorded some 205 extinct species and varieties of *Trionyx* worldwide; subsequent taxa have been described. Fossil material referred to *Trionyx* is known from Upper Cretaceous to Recent of North America (Romer, 1956, 1966; Estes, 1970; some references in Webb, 1962), Lower Cretaceous of Asia (Nessov, 1984, 1986), Cretaceous to Pliocene of Europe and Pleistocene to Recent of the East Indies (Romer, 1956), Miocene of Africa (Wood, 1986), and Pliocene-Pleistocene ("possibly as early as Miocene") of Australia (Gaffney and Bartholomai, 1979). Wood and Patterson (1973) reported a Pliocene (= Miocene *vide* Estes and Baez, 1985) waif from Venezuela. *Trionyx primaevus* (Upper Jurassic, Europe) is most likely a sea turtle (Mylnarski, 1976).

Of the two introduced species treated in this report, *Trionyx steindachneri* is unknown from fossil material, whereas *T. sinensis* was reported from the Pliocene of east Asia (Mylnarski, 1976). *Trionyx ferox* and *T. spiniferus* were recorded from Pleistocene deposits in the United States. No trionychid fragments have been definitely assigned to *T. muticus* (Webb, 1973b-d).

Four North American genera (*Conchocheilus*, *Helopanopia*, *Axestemys*, *Temnotrionyx*; see Hay, 1908) and a fifth (*Paleotrionyx*, Schmidt, 1945) are now generally regarded as synonyms of *Trionyx* (Romer, 1956, 1966). Hay (1908) recognized some 50 fossil species, and additional material has been described (perhaps a total of some 60 North American fossil species of *Trionyx*). However, recognition of fossil taxa is problematical owing to non-agreement of taxonomic criteria (Gaffney, 1979b; Sullivan and Lucas, 1986). For the moment, recognition of *Aspideretes* (genus or subgenus) for Cretaceous into Eocene material (presence of large preneural) and *Trionyx* for Eocene to Recent taxa (absence of large preneural) seems prudent (K. Carpenter, 1981; Weems, 1988).

• **Pertinent Literature.** Worthwhile general references are

Wermuth and Mertens (1961, 1977), Smith and Smith (1980), and King and Burke (1989). Species recognition based on different carapaces are in Geoffroy Saint-Hilaire (1809b) and plastra in Siebenrock (1902). Characters of *Trionyx* (compared to *Carettochelys*) are in Walthers (1922). Proposed interrelationships of species are in Loveridge and Williams (1957) and Meylan (1984, 1987). Mlynarski (1976) and Broin (1977) recently recognized three subgenera, and Meylan (1987) several genera, with data of all authors based on skeletal features. All species of *Trionyx* are treated in a descriptive synopsis by Webb (in press).

The three American species (*T. ferox*, *T. muticus*, *T. spiniferus*) are treated in revisionary fashion by Agassiz (1857), Siebenrock (1924), Stejneger (1944), Neill (1951, except *T. muticus*), and Webb (1962). Most of the pertinent literature through 1972 is listed in the species accounts (Webb, 1973b-d). The following references tend to update this literature (s = *T. spiniferus*, sp = *T. species unknown*, m = *T. muticus*, f = *T. ferox*). Some references were overlooked, some others, if not cited, are included in summary papers for which see appropriate references cited therein: kyphosis (White and Murphy, 1972, s); locomotor apparatus (Walker, 1973, s); head muscles and hyolaryngeal skeleton (Schumacher, 1973, s, m, f); rostral pores (Winokur and Legler, 1974, s, m); internal relief of gut (Parsons and Cameron, 1977, s, f); histology of gut (Luppa, 1977, f); urogenital system (Fox, 1977, s); gut length (Skoczylas, 1978, f); cranial feeding mechanism (Dalrymple, 1977, s, f); head retraction (Dalrymple, 1979, s, f); skull (Gaffney, 1979a, s, m, f); brain (Platel, 1979, f; Quay, 1979, m); snout erectile tissue (Winokur, 1982, s, f); skeletal mass (Iverson, 1984, s, f); buccopharyngeal mucosa (Winokur, 1988, s, f); ecology (Plummer, 1977a, m; Williams and Christiansen, 1981, s, m; Bancroft et al., 1983, f); fish antipredator behavior (Dominey, 1983, f); homing behavior (DeRosa and Taylor, 1980, 1982, s); diet-feeding (Plummer and Farrar, 1981, m; Cochran and McConville, 1983, s); predation (Clarkson and de Vos, and Minckley, in Greene, 1988); reproduction (Lardie, 1973, f; Plummer, 1977b, m; Robinson and Murphy, 1978, s; Iverson, 1985, f; Congdon and Gibbons, 1985, f; Miller et al., 1989, s); nesting (Ewert, 1976, s; Iverson, 1977, f; Deitz and Jackson, 1979, f; Landers et al., 1980, f); egg structure (Packard and Packard, 1979, s; Lamb and Congdon, 1985, f); embryogeny (Quay, 1976, s; C. Carpenter, 1981, s; Packard et al., 1981, s; Tracy, 1982, s, m; Packard and Packard, 1983, s; Gettlinger et al., 1984, s; Ewert, 1985, s, m, f); chromatophores (Bartley, 1971, sp); salinity tolerance and osmoregulation (Bentley, 1976, s; Dunson, 1986, s, m; Dunson and Seidel, 1986, f; Seidel, 1975, s); aquatic respiration (Belkin, 1968, f; Jackson and Schmidt-Nielsen, 1966, s; Jackson et al., 1976, m; Seymour, 1982, s); evaporative water loss (Robertson and Smith, 1982, s); thermoregulation (Smith et al., 1981, s); cadmium in tissues (Robinson and Wells, 1975, s); blood chemistry (Dessauer, 1970, f); plasma proteins (Seidel, 1974, s); plasma solutes (Minnich, 1982, s); adenosine deaminases (Ma and Fisher, 1971, f); serology (Frair, 1983, s, m; 1985, s, m, f); erythrocytes (Frair, 1977, s, f); lymphocytes (Ottaviana and Tazzi, 1977, m, f); DNA (Olmo, 1984, f); sex determination (Vogt and Bull, 1982, s); karyotypes (Bickham and Carr, 1983, s, m, f; Bickham et al., 1983, s, m, f); salmonella (Hoff and White, 1977, sp); parasites (Ernst and Ernst, 1977, s, m, f, general summary of helminths; Ernst and Ernst, 1979, s, m, f, general summary of protozoans; Dronen and Underwood, 1977, s, Brookes and Mayes, 1975, s, m, and Barker in Ernst and Ernst, 1975, s, m, all trematodes; Magath, 1924, s, tapeworm; Wach and Christiansen, 1976, 1977, s, coccidia; Hoff and Trainer, 1973, s, f, virus).

Pertinent literature for *T. steindachneri* is unknown to me other than references noted in Descriptions and Illustrations. Some of the references above mention *T. sinensis*: Walker (1973), Schumacher (1973), Winokur and Legler (1974), Fox (1977), Dalrymple (1977), Skoczylas (1978), Gaffney (1979a), Bickham and Carr (1983), Bickham et al. (1983), and Ewert (1985). Some other subjects treated include kyphosis (Gressitt, 1937), Rathke's glands (Rathouis, 1878), respiratory muscles (Shah, 1962), inner ear embryology (Kuwana, 1933), egg incubation (Choo and Chou, 1987), hormones-reproduction (Yip and Lofts, 1976; Lofts and Tsui, 1977; Licht, 1982); trematodes (Jin and Jianying, 1981); commercial farming in Singapore (Chou and Choo, 1986), metabolic enzymes (Bennett and Dawson, 1976); dermal nerve endings (Düring and Miller, 1979); gross anatomy of skeleton (Ogushi, 1911); musculature, circulation, nerves (Ogushi, 1913).

• **Key to Species.** This key distinguishes only the American species of *Trionyx* (including the two Asian species, *T. sinensis* and

T. steindachneri, introduced and occurring in wild populations in Hawaii). Parenthetic numbers refer to published Catalogue accounts.

1. Carapace of hatchlings and young lacking longitudinal ridge-like rows of minute tubercles; anterolateral rim of carapace lacking marginal ridge 2

Carapace of hatchlings and young with longitudinal rows of minute tubercles; anterolateral rim of carapace with marginal ridge 3
2. Nasal septal ridges absent; anterior edge of carapace completely smooth (lacking tubercles)..... *T. muticus* (139)

Nasal septal ridges present; anterior edge of carapace with slightly raised or prominent conical tubercles *T. spiniferus* (140)
3. Juvenile head-neck patterned with broad yellowish postocular stripes (absent in adults); large protuberant patch of tubercles on either side at base of neck (most prominent in adults) *T. steindachneri*

Combination of characters not as described 4
4. Plastron of hatchlings and juveniles with, usually symmetrically arranged, small black blotches (absent in adults); head pattern of dark narrow lines radiating from eyes (may be obscured in some adults); hyo-hyoplastra not fused in adults *T. sinensis*

Plastron of hatchlings and juveniles lacking small distinct dark blotches; head lacking dark lines radiating from eyes; young with pale stripes and markings on blackish head-neck (may be less distinct in large males, pattern lost in large females); hyo-hyoplastra fused in adults *T. ferox* (138)

• **Nomenclatural History.** Smith and Smith (1963) presented a history of the nomenclatural confusion relative to the use of proper generic names (chiefly *Amyda* and *Trionyx*) in their proposal to the ICZN to suppress *Amyda*. The ICZN took no action pending publication of the revised Code (in 1964); provisions of the 1964 (and 1985) Code provided for the desired stability of nomenclature (Smith and Smith, 1980:209). However, the current use of *Trionyx* dogged by two valid type-species designations in 1828, one by Bory de Saint-Vincent of *T. aegyptiacus* (= *T. triunguis*), the other by Bell of *T. coromandelicus* (= *Lissemys punctata*); Smith and Smith (1980) chose Bory de Saint-Vincent as having priority over Bell. However, Roger Bour (*in litt.*) noted month priority of Bell, whose designation, if followed, disrupts stability of existing nomenclature.

Geoffroy's original description of the genus *Trionyx* was published in two papers in the same year (1809a in July, 1809b in August). The correct original spelling for the name of one of Geoffroy's species is "*Egyptiacus*" (1809a:366), whereas the amended spelling of "*Aegyptiacus*" (1809b:12) in the second more elaborate paper (with illustrations) is cited by most authors.

The genus *Chemelys* Rafinesque, 1832, regarded as a synonym of *Trionyx* by Romer (1956), was discussed by Webb (1973b), Smith and Smith (1980), and Ernst (1981). Despite the comment by Pritchard and Trebbau (1984:165), I consider *Chemelys* not applicable to trionychid turtles (name thus excluded from synonymy). *Chemelys* is a *nomen suppressum* (Smith and Chiszar, 1989) and is unavailable for use as a valid name (ICZN, Opinion 1309, 1985).

Each of the five species treated in this account is the type-species of a proposed genus (see Synonymy). The earliest genus-group taxon applicable to the three American species is *Apalone* as selected by first revisers Smith and Smith (1980:211) to have priority over the simultaneously published *Mesodeca* (Rafinesque, 1832). Currently the three American species are referred to the genus *Apalone* (*spinifera* and *mutica* to subgenus *Apalone*, *ferox* to subgenus *Platypeltis*), with the two introduced species recognized as *Pelodiscus sinensis* and *Palea steindachneri* (Meylan, 1987). Webb (in press) has employed *Trionyx* for these taxa (see Comment).

The species *Trionyx ater* (Webb, 1962; 1973a) is regarded by Smith and Smith (1980:220) as a one-time recognizable subspecies (*T. spiniferus ater*) that is now being genetically assimilated by *T. s.*

emoryi (through intervention of man).

• **Etymology.** The generic name *Trionyx* (a noun of masculine gender), derived from the Greek *treis* with reference to three and *onyx* to claw, refers to the inner three-clawed digits on each limb.

• **Comment.** Meylan (1987), in his cladistic study of all living trionychid taxa based on osteological data, proposed a novel classification with the 15 species of the genus *Trionyx* subdivided into nine genera, six monotypic. Although Meylan's review is an important first step, unequivocal, total acceptance of his classification is premature. Webb (in press) agrees in recognition of at least *Aspideretes* and *Dogania* (genus or subgenus), but does not agree in recognition of the subfamily Chitridinae. My on-going study of these turtles, utilizing external morphology and skeletal features, indicates additional taxonomic characters, and suggests different character states for some features used by Meylan. All facts and figures are not yet in; further analysis and refinement is needed.

Of the three American species, *T. spiniferus* and *T. muticus* seem to be more closely related to each other than either is to *T. ferox*. Meylan (1987) employed two different subgenera to reflect this relationship, and Webb (1962) noted that only *T. ferox* shared some external features with living Old World species. *Trionyx sinensis* and *T. steindachneri* are not closely related to the three American species.

Literature Cited

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